CLAIMS

What is claimed is:

1. A process for removing metalloaluminophosphate molecular sieve contaminants from an oxygenate feed and converting the oxygenate in the feed to olefin product, comprising the steps of:
   a) heating the oxygenate feed to form a vapor stream containing a majority of oxygenates in the oxygenate feed and a liquid stream containing a majority of metalloaluminophosphate molecular sieve contaminants in the oxygenate feed;
   b) separating the vapor stream from the liquid stream; and
   c) contacting the separated vapor stream with metalloaluminophosphate molecular sieve to convert the oxygenates in the stream to olefin product.

2. The process of claim 1, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 75 wt % of the oxygenates in the oxygenate feed.

3. The process of claim 2, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 85 wt % of the oxygenates in the oxygenate feed.

4. The process of claim 3, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 95 wt % of the oxygenates in the oxygenate feed.

5. The process of claim 4, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 98 wt % of the oxygenates in the oxygenate feed.

6. The process of claim 1, wherein the oxygenate feed comprises methanol.

7. The process of claim 1, wherein at least a portion of the liquid stream is discarded and the discarded portion contains at least 75 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

8. The process of claim 7, wherein the discarded portion contains at least 80 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

9. The process of claim 8, wherein the discarded portion contains at least 85 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

10. The process of claim 9, wherein the discarded portion contains at least 90 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

11. The process of claim 1, wherein the metalloaluminophosphate molecular sieve contaminants are non-volatiles or partial volatiles.

12. The process of claim 1, wherein the oxygenate feed is heated to a temperature that is greater than or equal to the boiling point of methanol at the pressure at which the oxygenate feed is heated.

13. The process of claim 1, wherein the oxygenate feed is heated to a temperature that is lower than the boiling point of 1-octene at the pressure at which the oxygenate feed is heated.

14. The process of claim 1, wherein the oxygenate feed is heated to form a vapor stream at a temperature that is not greater than 200°C.

15. The process of claim 14, wherein the oxygenate feed is heated to form a vapor stream at a temperature that is not greater than 150°C.

16. The process of claim 7, wherein the metalloaluminophosphate molecular sieve catalyst contaminants in the discarded portion include at least one metal selected from the group consisting of iron, sodium and potassium.

17. The process of claim 16, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 1 wppm, based on total weight of the liquid stream.

18. The process of claim 17, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 5 wppm, based on total weight of the liquid stream.

19. The process of claim 18, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 10 wppm, based on total weight of the liquid stream.

20. The process of claim 16, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

21. The process of claim 20, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 2 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

22. The process of claim 21, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 1 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

23. The process of claim 22, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 0.5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

24. The process of claim 1, wherein a majority of the oxygenate in the oxygenate feed is methanol.

25. The process of claim 1, wherein the process further comprises a step of discarding at least a portion of the separated liquid stream.

26. The process of claim 1, wherein the steps of heating the oxygenate and separating the vapor stream are carried out in one stage.

27. The process of claim 1, wherein the steps of heating the oxygenate and separating the vapor stream are carried out in more than one stage.

28. A process for converting oxygenate feed to olefin product, comprising the steps of:

a) heating an oxygenate feed comprising methanol and metalloaluminophosphate molecular sieve catalyst contaminants, at atmospheric pressure or above, to at least the boiling point of the methanol at the pressure at which the oxygenate feed is heated, to form a vapor stream containing a majority of the methanol in the oxygenate feed and a liquid stream containing a majority of

metalloaluminophosphate molecular sieve contaminants in the oxygenate feed;

b) separating the vapor stream from the liquid stream, wherein the liquid stream comprises a majority of the metalloaluminophosphate molecular sieve catalyst contaminants in the oxygenate feed; and

c) contacting the separated vapor stream with metalloaluminophosphate molecular sieve catalyst to convert the methanol in the vapor stream into olefin product.

29. The process of claim 28, wherein the process further comprises a step of discarding at least a portion of the separated liquid stream.

30. The process of claim 28, wherein the steps of heating the oxygenate feed and separating the vapor stream are carried out in one stage.

31. The process of claim 30, wherein the steps of heating the oxygenate feed and separating the vapor stream are carried out in more than one stage.

32. The process of claim 28, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 75 wt % of the methanol in the oxygenate feed.

33. The process of claim 32, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 85 wt % of the methanol in the oxygenate feed.

34. The process of claim 33, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 95 wt % of the methanol in the oxygenate feed.

35. The process of claim 34, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 98 wt % of the methanol in the oxygenate feed.

36. The process of claim 28, wherein at least a portion of the liquid stream is discarded and the discarded portion contains at least 75 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

37. The process of claim 36, wherein the discarded portion contains at least 80 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

38. The process of claim 37, wherein the discarded portion contains at least 85 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

39. The process of claim 38, wherein the discarded portion contains at least 90 wt % of the metalloaluminophosphate molecular sieve contaminants in the oxygenate feed.

40. The process of claim 28, wherein the metalloaluminophosphate molecular sieve contaminants are non-volatiles or partial volatiles.

41. The process of claim 28, wherein the oxygenate feed is heated to a temperature that is lower than the boiling point of 1-octene at the pressure at which the oxygenate feed is heated.

42. The process of claim 28, wherein the oxygenate feed is heated to form a vapor stream at a temperature that is not greater than 200°C.

43. The process of claim 42, wherein the oxygenate feed is heated to form a vapor stream at a temperature that is not greater than 150°C.

44. The process of claim 36, wherein the metalloaluminophosphate molecular sieve catalyst contaminants in the discarded portion include at least one metal selected from the group consisting of iron, sodium and potassium.

45. The process of claim 44, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 1 wppm, based on total weight of the liquid stream.

46. The process of claim 45, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 5 wppm, based on total weight of the liquid stream.

47. The process of claim 46, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 10 wppm, based on total weight of the liquid stream.

48. The process of claim 44, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

49. The process of claim 48, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 2 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

50. The process of claim 49, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 1 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

51. The process of claim 50, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 0.5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

52. The process of claim 28, wherein the process further comprises a step of discarding at least a portion of the separated liquid stream.

53. A process for forming an olefin product, comprising the steps of:

a) contacting a synthesis gas with a carbon oxide conversion catalyst to form a feedstream that comprises methanol;

b) transporting the feedstream in a container to a location geographically distinct from that where the feedstream was formed;

c) heating the transported feedstream to form a vapor stream that comprises a majority of methanol in the feedstream and a liquid stream that contains metalloaluminophosphate molecular sieve contaminants;

d) separating the vapor stream from the liquid stream; and

e) contacting the separated vapor stream with metalloaluminophosphate molecular sieve to convert the methanol in the feedstream to olefin product.

54. The process of claim 53, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 75 wt % of the methanol in the feedstream.

55. The process of claim 54, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 85 wt % of the methanol in the feedstream.

56. The process of claim 55, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 95 wt % of the methanol in the feedstream.

57. The process of claim 56, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains at least 98 wt % of the methanol in the feedstream.

58. The process of claim 57, wherein at least a portion of the separated liquid stream is discarded and the discarded portion contains at least 75 wt % of the metalloaluminophosphate molecular sieve contaminants in the transported feedstream.

59. The process of claim 58, wherein the discarded portion contains at least 80 wt % of the metalloaluminophosphate molecular sieve contaminants in the transported feedstream.

60. The process of claim 59, wherein the discarded portion contains at least 85 wt % of the metalloaluminophosphate molecular sieve contaminants in the transported feedstream.

61. The process of claim 60, wherein the discarded portion contains at least 90 wt % of the metalloaluminophosphate molecular sieve contaminants in the transported feedstream.

62. The process of claim 53, wherein the metalloaluminophosphate molecular sieve contaminants are non-volatiles or partial volatiles.

63. The process of claim 53, wherein the transported feedstream is heated to a temperature that is greater than or equal to the boiling point of methanol at the pressure at which the oxygenate feed is heated.

64. The process of claim 53, wherein the transported feedstream is heated to a temperature that is lower than the boiling point of 1-octene at the pressure at which the oxygenate feed is heated.

65. The process of claim 53, wherein the transported feedstream is heated to form a vapor stream at a temperature that is not greater than 200°C.

66. The process of claim 65, wherein the transported feedstream is heated to form a vapor stream at a temperature that is not greater than 150°C.

67. The process of claim 53, wherein the metalloaluminophosphate molecular sieve catalyst contaminants include at least one metal selected from the group consisting of iron, sodium and potassium.

68. The process of claim 53, wherein at least a portion of the liquid stream is discarded and the discarded portion has a total iron, sodium and potassium concentration of at least 1 wppm, based on total weight of the discarded portion.

69. The process of claim 68, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 5 wppm, based on total weight of the discarded portion.

70. The process of claim 69, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 10 wppm, based on total weight of the discarded portion.

71. The process of claim 67, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

72. The process of claim 71, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 2 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

73. The process of claim 72, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 1 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

74. The process of claim 73, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 0.5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

75. The process of claim 53, wherein the process further comprises a step of discarding at least a portion of the separated liquid stream.

76. The process of claim 53, wherein the steps of heating the transported feedstream and separating the vapor stream are carried out in one stage.

77. The process of claim 53, wherein the steps of heating the transported feedstream and separating the vapor stream are carried out in more than one stage.

78. A process for shipping methanol and converting the methanol to olefin product, comprising the steps of:

a) loading methanol into a hold of a ship;

b) transporting the methanol to a location geographically distinct from where the methanol was loaded into the ship;

c) withdrawing at least a portion of the methanol from the hold;

d) adding a blanketing medium to the hold;

e) heating the withdrawn methanol to form a vapor stream that comprises a majority of methanol and a liquid stream that contains metalloaluminophosphate molecular sieve contaminants;

f) separating the vapor stream from the liquid stream; and

g) contacting the separated vapor stream with metalloaluminophosphate molecular sieve to convert the methanol to olefin product.

79. The process of claim 78, wherein the metalloaluminophosphate molecular sieve catalyst contaminants include at least one metal selected from the group consisting of iron, sodium and potassium.

80. The process of claim 78, wherein at least a portion of the separated liquid stream is discarded and the discarded portion has a total iron, sodium and potassium concentration of at least 1 wppm, based on total weight of the discarded portion.

81. The process of claim 80, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 5 wppm, based on total weight of the discarded portion.

82. The process of claim 81, wherein the discarded portion has a total iron, sodium and potassium concentration of at least 10 wppm, based on total weight of the discarded portion.

83. The process of claim 79, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

84. The process of claim 83, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 2 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

85. The process of claim 84, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 1 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

86. The process of claim 85, wherein the vapor stream contacting the metalloaluminophosphate molecular sieve contains not greater than 0.5 wppm of any one metal selected from the group consisting of iron, sodium and potassium, based on total weight of the vapor stream contacting the sieve.

87. The process of claim 86, wherein the blanketing medium is a gas.

88. The process of claim 78, wherein the steps of heating the transported methanol and separating the vapor stream are carried out in one stage.

89. The process of claim 78, wherein the steps of heating the transported methanol and separating the vapor stream are carried out in more than one stage.